The U.S. equivalent to "Masuta" is U.S. Patent 3,927,889 that will be referred to in Applicants' arguments below.

The Final Rejection alleges that each of the Simpson et al. patents describes X-radiation sensitive photothermographic materials containing phosphors that are known as "dry silver" materials further comprising a photosensitive catalyst, non-photosensitive source of reducible silver ions, reducing composition, and a hydrophobic or hydrophilic binder. Various silver salts are described and a wide variety of reducing agents are described for use with them. The Final Rejection alleges the usefulness of fluorescent intensifying screens with the photothermographic materials but fails to cite relevant prior art. The Final Rejection also admits that the Simpson et al. patents are silent as to Applicants' specific ascorbic acid derivatives as reducing agents.

"Masuta" is cited as teaching photothermographic silver halide films containing silver benzotriazole and a "reducing agent meeting the instant claim limitations", a binder, and a photosensitive silver halide (preferably silver bromide and/or iodide). The Final Rejection (page 4) is confusing, however, in that is states that "Masuta" anticipates the "instant claims" when the issue raised by the Final Rejection is patentability.

Taguchi is cited for disclosing a thermally developable photosensitive material comprising a binder, photosensitive silver halide (AgBrI), a dye/reducing agent that "meets the instant claim limitations", and a tetrazole compound.

The Final Rejection then sums up its arguments by stating that it would be obvious to one skilled in the art to prepare the material of either of the Simpson et al. patents with the ascorbic acid reducing agents of "Masuta" or Taguchi with a reasonable expectation of achieving a material with increased sensitivity/speed.

Applicants respectfully disagree with the "final" rejection for a number of reasons. Before presenting those reasons, a brief description of the presently claimed invention is presented.

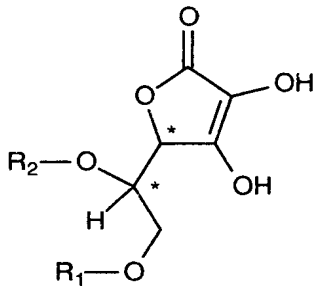
Applicants' Invention:

The reduction of the silver ions in silver benzotriazole to silver metal in photothermographic materials generally requires a relatively strong

reducing agent. A typical developer choice is ascorbic acid that has been shown to provide useful photospeed, adequate Dmax, and low Dmin. Derivatives (such as esters) of ascorbic acid have also been described in the art as reducing agents for silver ions in organic silver salts. For example, ascorbic acid palmitate, dipalmitate, stearate, myristate, and laurate are described in the art for this purpose.

However, since these compounds have been disadvantageous for one reason or another, there has been continuing work in the art to develop aqueous-based thermally developable materials using silver benzotriazole and other strong reducing agents. Because some imaging systems include components that may lead to image instability, especially in aqueous-based imaging materials, there has also been a continuing need to find the most suitable silver ion reducing agents to improve post-processing light stability of the imaged materials.

Applicants have found that a specific class of reducing agents provide improved post-processing print stability of images in aqueous-based, thermally developable compositions and materials containing silver salts such as silver benzotriazole. These reducing agents are compounds represented by the following Structure (I):



(I)

wherein R_1 and R_2 are independently hydrogen or an acyl group having 11 or fewer carbon atoms, provided that at least one of R_1 and R_2 is an acyl group.

Applicants have demonstrated that these compounds provide improved results over the use of ascorbic acid (see Applicants Examples 1 and 2, pages 46-57 with data in TABLES III and IV). The data demonstrate an advantage especially for the improvement in post-processing print stability

("Light Box Test" in TABLE III and the reduced change in D_{min} shown in TABLE IV).

To further demonstrate that the results from use of the ascorbic acid derivatives of Structure (I) are unexpected over the teaching of the prior art, Applicants tried to use a conventional ascorbic acid derivative, 1-ascorbyl palmitate in the same manner. The **Rule 132 Declaration** ("Declaration 1") presented with Applicants' last response by co-Applicant James Philip, Jr. indicates that this compound could not be used in an aqueous-based thermally developable composition according to the present invention. This disadvantage is not apparent from the teaching in the art (especially "Masuta").

In addition, Applicants are presenting herewith another **Rule 132 Declaration** ("Declaration 2") by Dr. Philip in which he carried out the same experiments and attempted to use the laurate, myristate, and stearate esters of ascorbic acid, as taught in "Masuta", in aqueous-based formulations. None of these esters could be dissolved and are thus useless in the practice of the presently claimed invention.

Thus, Applicants evaluated four of the ascorbic acid esters suggested in "Masuta" as reducing agents in photothermographic materials and found that they were not useful in the aqueous-based formulations necessary for the presently claimed invention. Yet, Applicants have found a unique class of ascorbic acid derivatives that are unexpectedly useful in the aqueous-based compositions and materials of the presently claimed invention to improve post-processing print stability. The use of this particular class of ascorbic acid esters is highly unpredictable in view of this consistent showing of unexpected results.

Rebuttal of Final Rejection:

The primary references of Simpson et al. admittedly describe a number of the common features of photothermographic materials. However, as admitted by the Examiner, they fail to teach the use of critical ascorbic acid derivatives of the present invention as reducing agents. Moreover, it should be appreciated that neither Simpson et al. reference is directed to the problem of improved "post-processing" print stability of the resulting black-and-white images.

Applicants respectfully submit that neither "Masuta" nor Taguchi supplies the missing teaching. Moreover, the combined teaching fails to teach or suggest the presently claimed aqueous-based, black-and-white photothermographic materials containing the critical ascorbic acid derivatives as reducing agents. The Final Rejection alleges that the combined teaching would suggest the claimed invention to improve sensitivity/speed, but this it not the problem addressed by the present invention.

Considering "Masuta" first, Applicants respectfully point out that this reference fails to direct a skilled artisan to aqueous-based photothermographic materials and compositions. The only teaching about formulations and binders is found in the Examples (TABLE 1) where polyvinyl butyral is used as the binder and the formulation was prepared and coated out an organic solvent. This is indicative of organic-solvent based photothermographic materials not aqueous-based materials.

More importantly, this reference teaches a number of higher alkyl ascorbic acid derivatives such as 1-ascorbyl palmitate, and the laurate, myristate, and stearate esters, for use as reducing agents. As pointed out by Dr. Philip in both Declarations 1 and 2, these compounds cannot be used in the present invention. None of these esters would not dissolve in water even when heated at 55°C and with application of sonic energy for one half hour. In contrast, when the same premix was prepared using a molar equivalent amount of 1-ascorbyl pivalate (Compound I-1 of the invention), complete dissolution occurred at 55°C with sonic energy. Additionally, the esters would not dissolve in a mixture of 50% water and 50% methanol even when the mixture was heated at 40°C (Declaration 2). In contrast 1-ascorbyl pivalate was soluble in such a mixture. Because of the unpredictable solubility of such chemical compounds, a skilled worker would not therefore be motivated by "Masuta" to use the specific class of reducing agents of Applicants' Structure (I) because similar compounds are worthless. They can't be used in the present invention.

Taguchi is no better for supplying the missing teaching. First of all, it is directed to "color" media. In view of the different chemistry and chemical mechanisms used for color and black-and-white imaging materials, one skilled in the art would not even consult Taguchi to solve a problem of light instability in black-and-white photothermographic images. The fact that

"dye/reducing agents" may be used in Taguchi is irrelevant generic teaching because it fails to suggest Applicants' unique class of ascorbic acid esters to solve a post-processing print instability problem in black-and-white images.

Thus, the secondary references cited in the Office Action fail to direct or motivate a skilled artisan to use Applicants' unique class of reducing agents that solve the noted post-processing print instability problem in aqueous-based photothermographic materials, particularly in view of the showing of unexpected results that is unrefuted evidence of unpredictability in this particular art.

Response to Examiner's Final Remarks:

The Examiner has provided further remarks beginning at the bottom of page 4 of the Final Rejection.

The Examiner argues that Applicants have argued that "Masuta" and Taguchi cannot be combined with the Simpson references. Applicants have not argued this. What they have argued is that the teaching in both secondary references fails to supply teaching to the primary references that renders the claimed invention unpatentable because of the demonstrated unpredictability of using esters of ascorbic acid as reducing agents in Applicants' aqueous-based photothermographic materials.

Applicants have not tried just one compound suggested by "Matsuta" but the three specific esters evaluated in TABLE 1 and a fourth ester (stearate ester) that is also within the scope of the formulae in Col. 3. They have taken the preferred esters of "Masuta" and demonstrated that they are useless in the practice of the presently claimed invention. This is clearly a good faith and sufficient and unrefuted effort to demonstrate unexpected results under Section 103.

The Examiner suggests that "Masuta" is relied upon for its "teachings that ascorbic compounds are employed in any photothermographic material as reducing agents." Applicants don't deny that there are possibly hundreds of publications generally describing the use of ascorbic acid compounds as reducing agents in various photothermographic materials. "Masuta" is clearly one of such publications.

What is different is that Applicants have been consistently pointing out in this prosecution is that there are various classes of ascorbic acid derivatives, such as classes of esters. "Masuta" teaches certain classes of such esters, and mentions three particularly in the examples. However, Applicants have clearly pointed out that those preferred compounds (as well as the stearate ester) are not useful in the presently claimed invention that includes aqueous-based photo-thermographic materials (and formulations required to make them). Only Applicants' compounds of Structure (I) are considered useful in these types of materials.

Applicants would not have expected this to be the case in view of the teaching in "Masuta" that is quite general and broad in concept but once the compounds taught in "Masuta" were found to be failures, Applicants realized how unpredictable it was to find suitable ascorbic acid reducing agents.

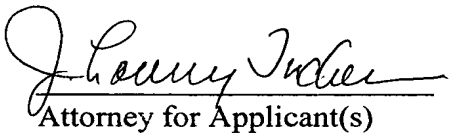
The Examiner's argument that Applicants is "persuasive" with respect to 1-ascorbyl-palmitate but not others is effectively rebutted by the showing provided in Dr. Philip's Declaration 2.

Similarly, the teaching in Taguchi is quite generic, even if applicable, and nothing there would suggest Applicants' specific class of ascorbic acid esters or the unexpected results they have shown over other similar classes of compounds.

While Applicants continue to dispute the assertion that a *prima facie* for obviousness has been made with the combination of "Masuta" and/or Taguchi with either Simpson et al. reference, even if that position is conceded, Applicants have effectively rebutted it with a clear and convincing showing of unexpected results that has not been given the proper probative weight in evaluating patentability. Thus, it is believed that the Section 103 rejection should be withdrawn.

In view of the foregoing remarks, reconsideration of this patent application is respectfully requested in order to avoid the necessity of an appeal. A prompt and favorable action by the examiner is earnestly solicited.

Respectfully submitted,



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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.